



Armed Forces College of Medicine AFCM



Front of Forearm

By

Prof Mervat Thabet

INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture, the student will be able to:

1. **Describe** the attachment, action and nerve supply of muscles of the front of forearm (superficial and deep)
2. **Describe** the course, relations and branches of ulnar and median nerves in the forearm
3. **Describe** the course , termination and branches of radial and ulnar arteries in the forearm

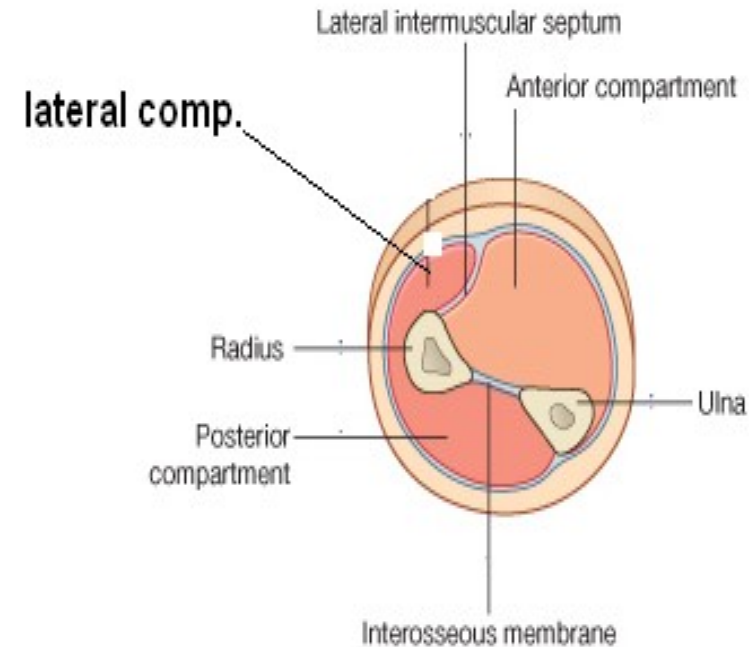
KEY POINTS OF THE LECTURE



1. Action and nerve supply of muscles of the front of forearm (superficial and deep)
2. Course, relations and branches of ulnar and median nerves in the forearm
3. Origin, course , termination and branches of radial and ulnar arteries in the forearm

Fascial Compartments of the Forearm:

- The forearm is enclosed within a sheath of deep fascia, which is attached to the posterior subcutaneous border of the ulna.
- This fascial sheath, together with the interosseous membrane, fibrous intermuscular septa, radius and ulna divide the forearm into two compartments; anterior and posterior compartments; each having its own muscles, nerves, and blood supply



CONTENTS OF ANTERIOR FASCIAL COMPARTMENT:

1- MUSCLES:

- Superficial group: of 5 muscles.**
- Deep group: of 3 muscles.**

2- Blood supply to muscles:

Ulnar and radial arteries.

3- Nerve supply to muscles:

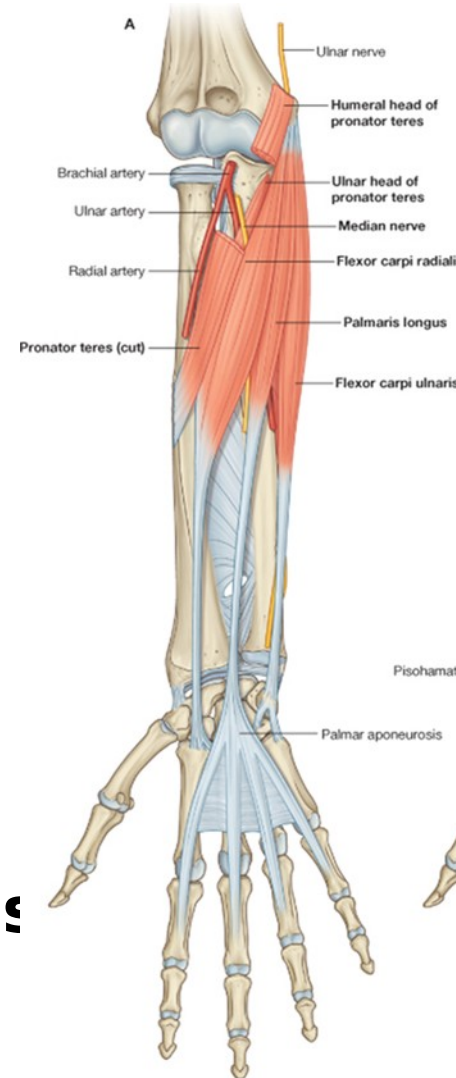
**Branches from median and ulnar
, nerves.**

MUSCLES OF THE ANTERIOR COMPARTMENT OF FOREARM:

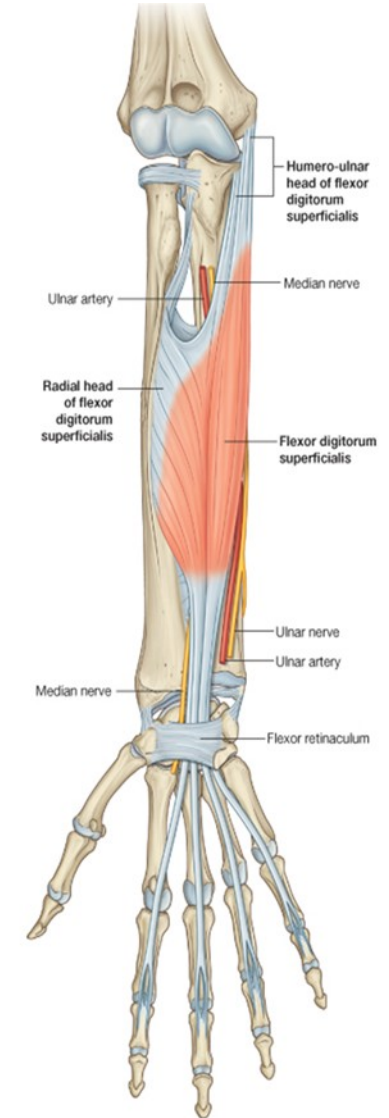
- They are 2 groups:

- Superficial group : 5 in number from lateral to medial

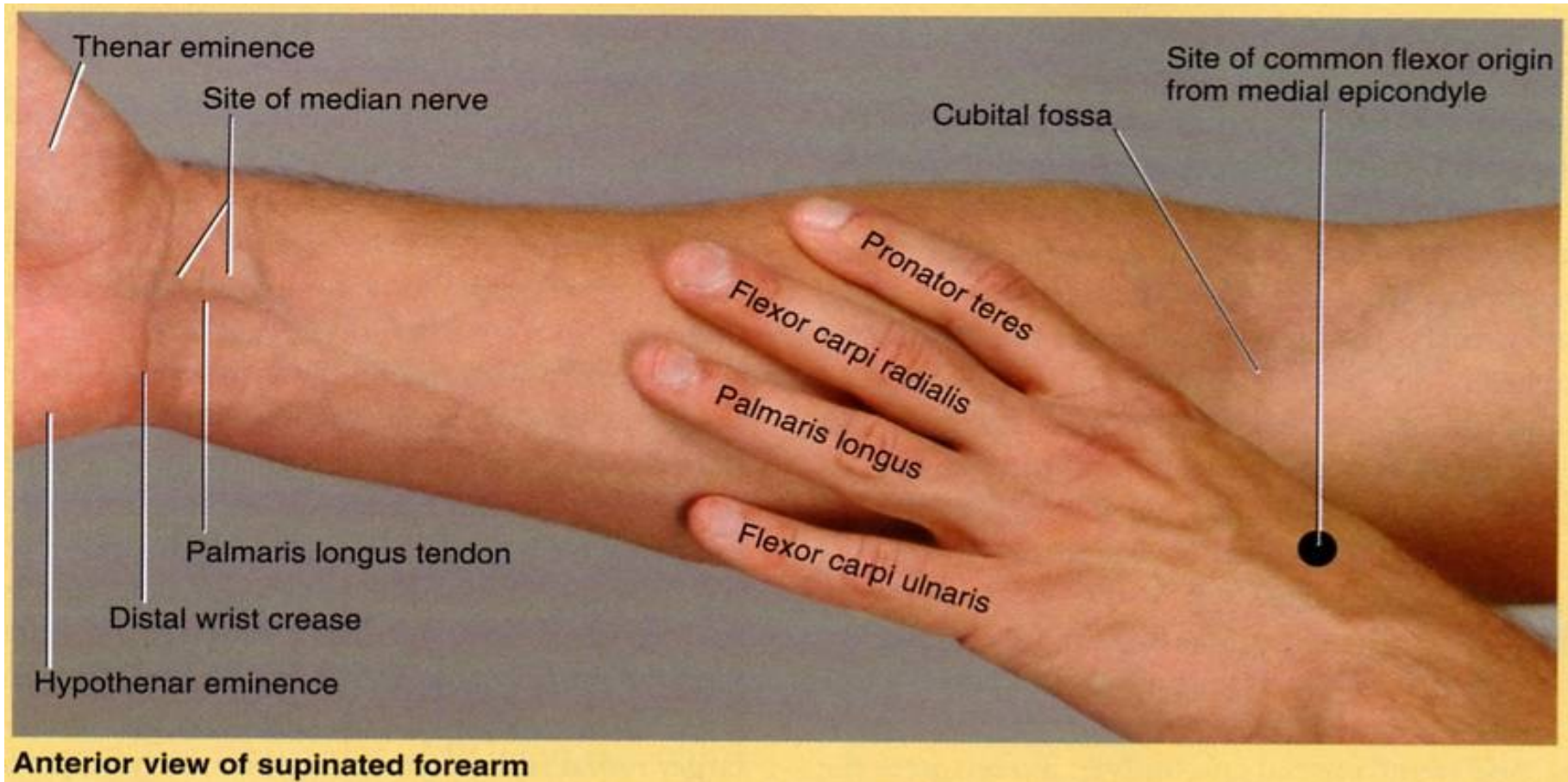
- 1- pronator teres.(short)
- 2- flexor carpi radialis.
- 3- palmaris longus (may be absent)
- 4- flexor carpi ulnaris.
- 5- flexor digitorum superficialis (at a deeper plane).



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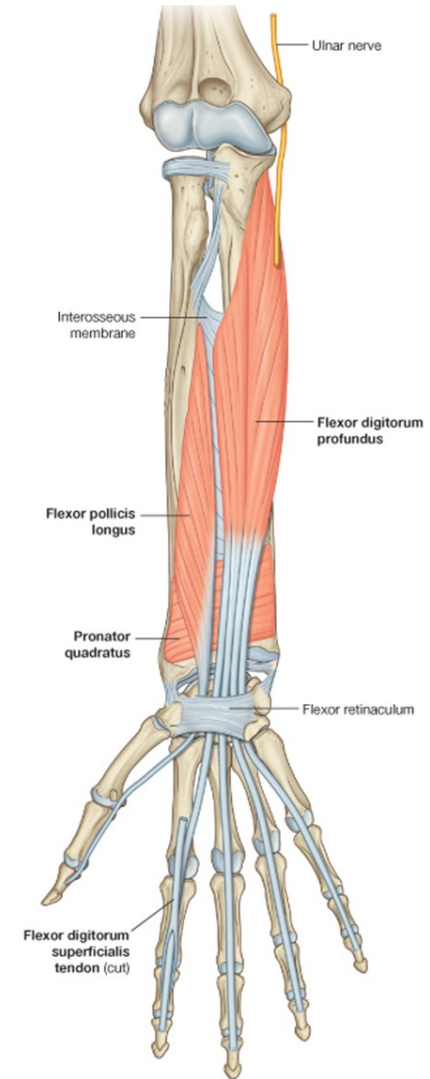


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Deep group: of 3 muscles.

- 1- Flexor pollicis longus.
- 2- Flexor digitorum profundus.
- 3- Pronator quadratus.
(short)



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All the superficial group have the following characters:

1- All of them take origin from front of medial epicondyle(common flexor origin) (i.e. from lower end of humerus).

Some have additional origin.

2- All are inserted in the hand except pronator teres in the radius.

3- All are supplied by median nerve except flexor carpi ulnaris by ulnar nerve.

4- All help in flexion of elbow.

5- All help in flexion of wrist except pronator teres.

Pronator teres -1

Origin-

humeral head :Medial -
supracondylar ridge and common
flexor origin (CFO)

ulnar head: coronoid process of -
.ulna

Insertion

Radius (middle of lateral surface)

Action

Flexion elbow -

.pronation -



flexor carpi radialis -2

Origin-

common flexor origin -

Insertion

**Base of 2nd , 3rd metacarpal
.bones**

Action

Flexion elbow -

.Flexion wrist -

.Abduction hand -



palmaris longus -3

Origin-

common flexor origin -

Insertion

Palmar aponeurosis

Action

.Flexion elbow -

.Flexion wrist -



flexor carpi ulnaris -4

Origin-

**Humeral head: common -
flexor origin**

**ulnar head: olecranon -
process and posterior border
of ulna**

Insertion

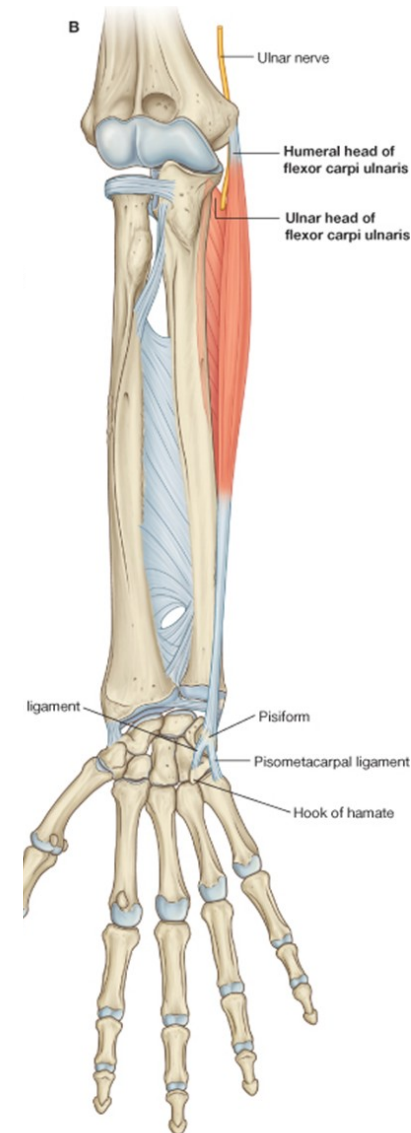
**Pisiform bone and base of 5th
metacarpal bone and hook of
hamate**

Action

Flexion elbow -

.Flexion wrist -

.Adduction hand -



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Action	Insertion	Origin	Muscle
Flexion - elbow .pronation -	Radius (middle of lateral surface)	Medial - epicondyle .(humeral head) coronoid-process of ulna(ulnar head)	-1 Pronator teres
Flexion - elbow Flexion - wrist Abduction - hand	Base of 2nd , 3rd metacarpal bones	Medial - epicondyle	flexor -2 carpi radialis
Flexion - elbow Flexion - wrist	Palmar aponeurosis	Medial - epicondyle	-3 palmaris longus
Flexion -	Pisiform	Medial -	flexor -4

Flexor digitorum-5 superficialis

Origin

humero-ulnar head : CFO and - coronoid process (as pronator teres)

radial head: anterior oblique - line of radius

Insertion

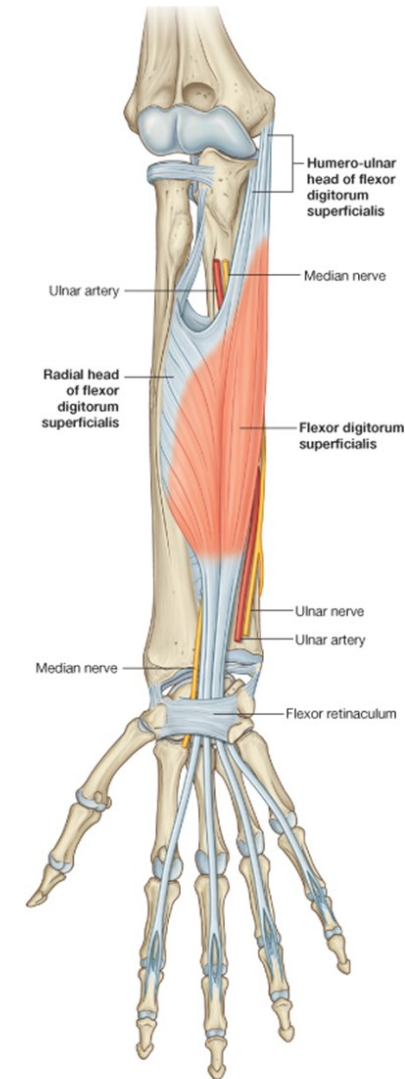
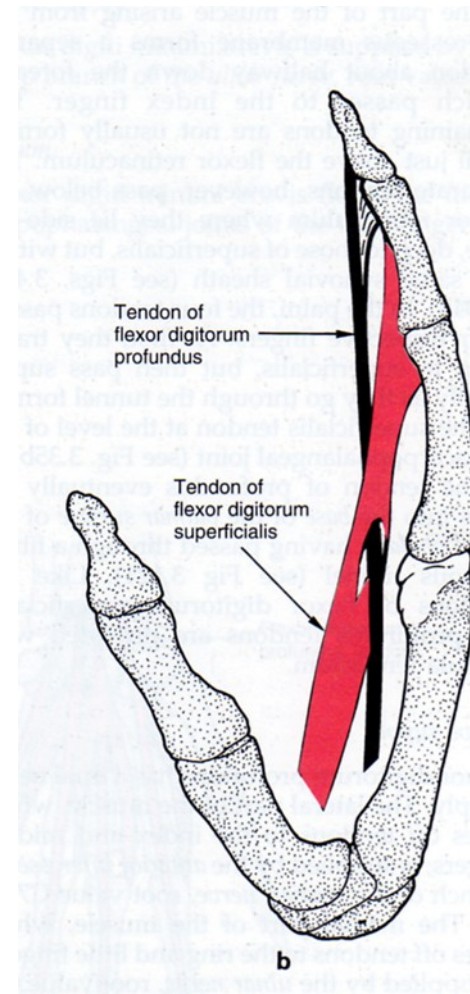
By 4 tendons into the middle .phalanges of medial 4 fingers

Action

.Flexion elbow -

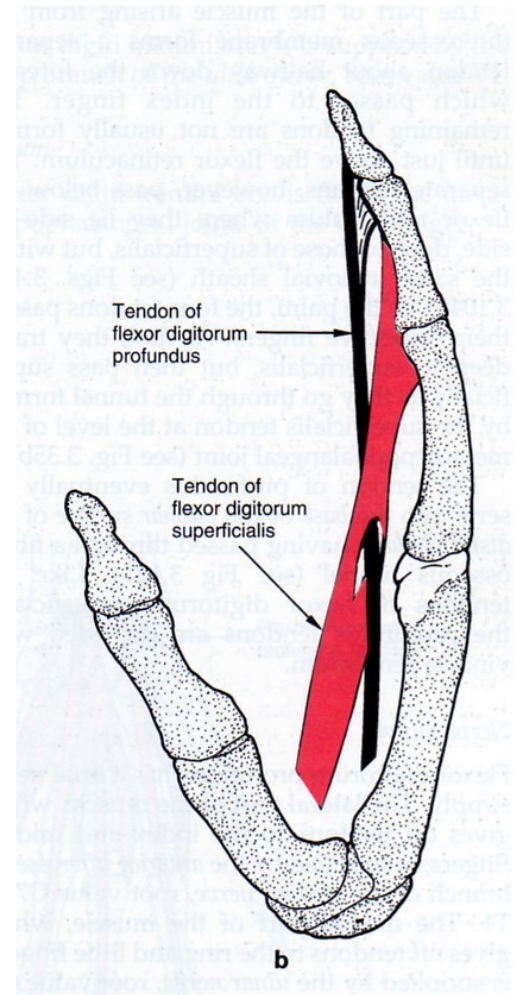
.Flexion wrist -

Flexion of proximal and - middle phalanges of medial 4 .fingers



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action	insertion	origin	Muscle
Flexion - .elbow Flexion - .wrist Flexion of - proximal and middle phalanges of medial .4 fingers	By 4 - tendons into the middle phalanges of medial 4 .fingers	Medial - .epicondyle . Ulna - .radius - humeroual) nar head and radial (head	Flexor-5 digitorum superficial is



B- Deep muscles:

They are 3 in number

1- Flexor pollicis longus.

2- Flexor digitorum profundus.

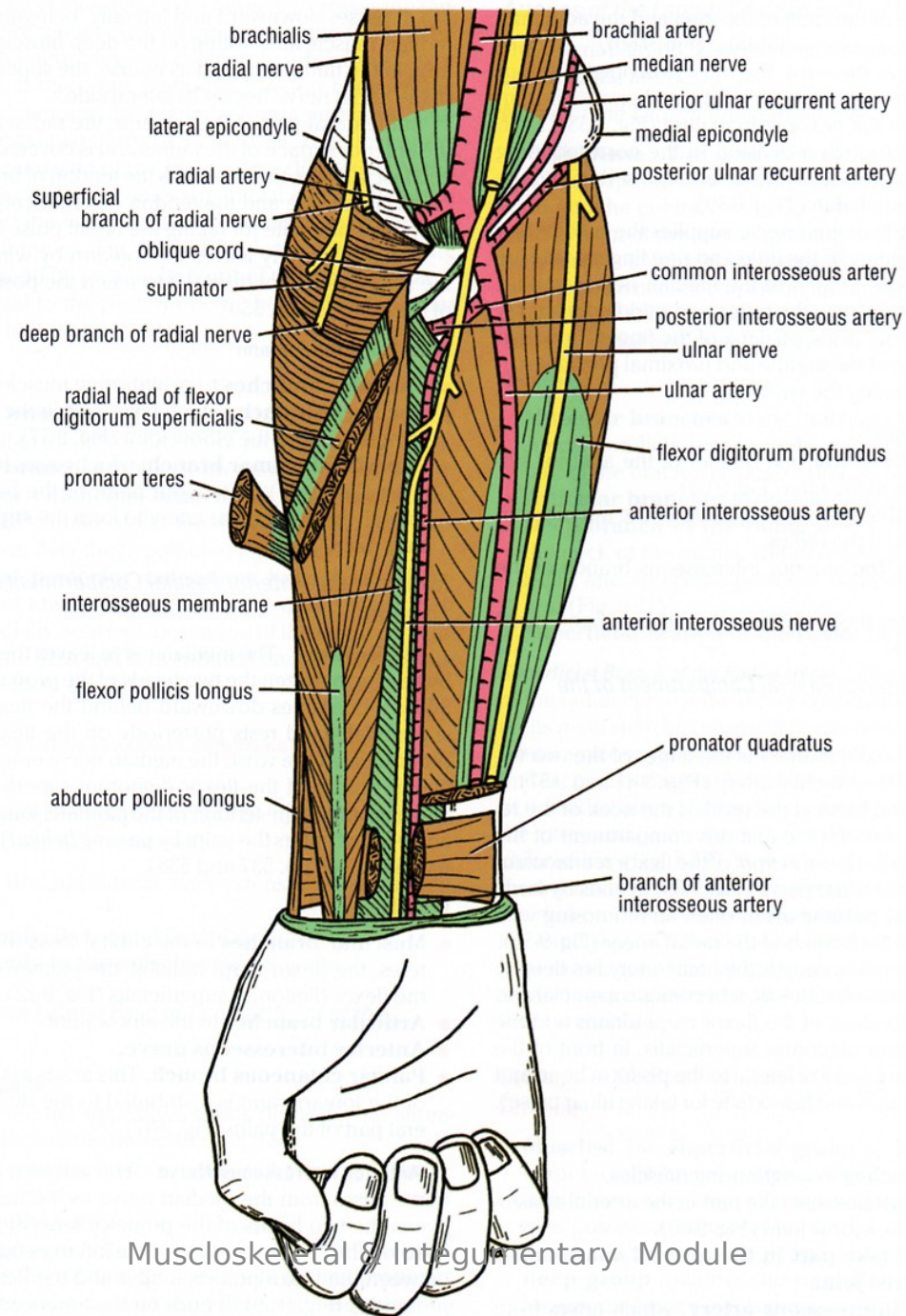
3- Pronator quadratus.

All the deep muscles have the following characters:

1- All take origin from radius or ulna only.

2- All inserted in hand except pronator quadratus in radius.

3- All supplied by anterior interosseous nerve (branch from median) except medial $\frac{1}{2}$ of flexor digitorum profundus by ulnar nerve.



:Deep group

.Flexor pollicis longus -1

Origin

**Anterior surface of radius and-
membrane**

Coronoid process-

Insertion

Base of terminal phalanx of
.thumb

Action

.Flexion wrist -

.Flex all joints of thumb -



Flexor digitorum -2 .profundus

:Origin

**Anterior surface of ulna-
and membrane**

Posterior border of ulna-

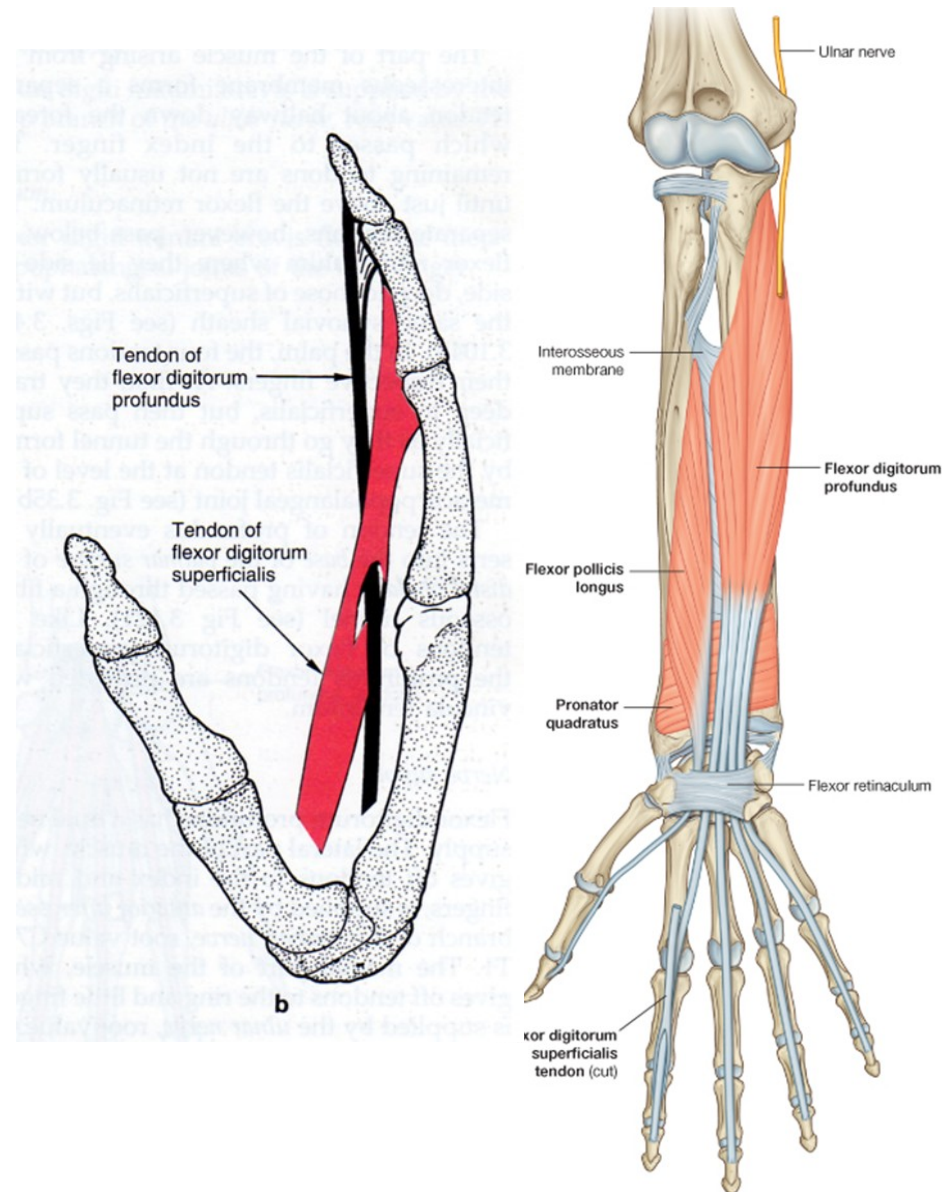
Insertion

Base of terminal phalanges of
.medial 4 fingers

Action

.Flex wrist -

Flex all joints of medial 4 -
.fingers



Pronator quadratus -3

:Origin

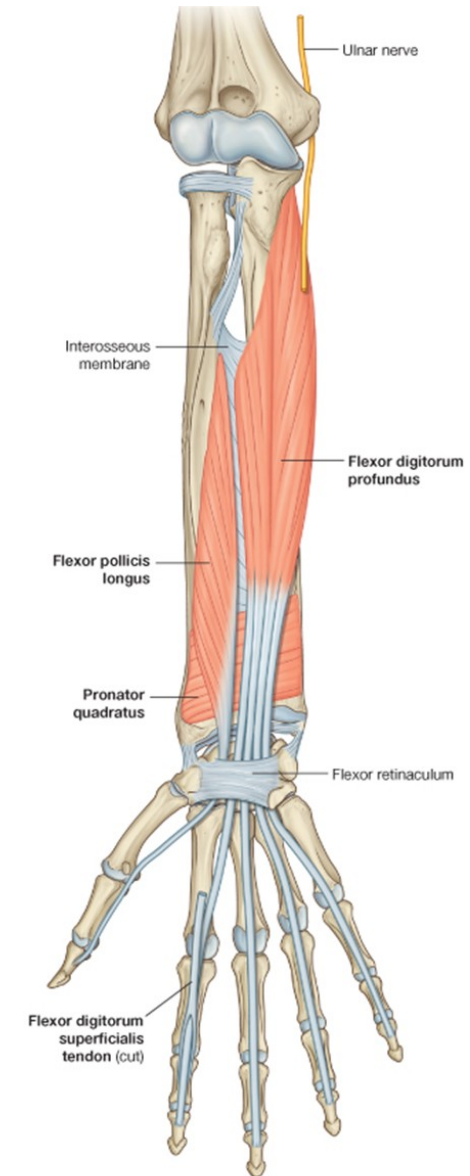
Lower part of shaft of ulna (oblique ridge)

Insertion

Lower part of anterior surface of shaft of radius

Action

Pronation -



C	Insertion	Origin	Muscle
.Flexion wrist - .Flex all joints of thumb -	Terminal phalanx of .thumb	Radius	Flexor -1 pollicis .longus
.Flex wrist - Flex all joints of medial - .4 fingers	Terminal phalanges of medial 4 .fingers	Ulna	Flexor -2 digitorum .profundus
.Pronation	.Radius	Ulna	Pronator -3 .quadratus

Medial epicondyle

Pronator teres

Pronator quadratus

Fig. 3.31 The attachments (shaded) of pronator teres and pronator quadratus of the left arm, anterior view.

All the muscles of superficial group have the following characters:

1- All of them take origin from front of medial epicondyle(common flexor origin).

Some have additional origin.

2- All are inserted in the hand except pronator teres in the radius.

3- All are supplied by median nerve except flexor carpi ulnaris by ulnar nerve.

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B- Deep muscles:

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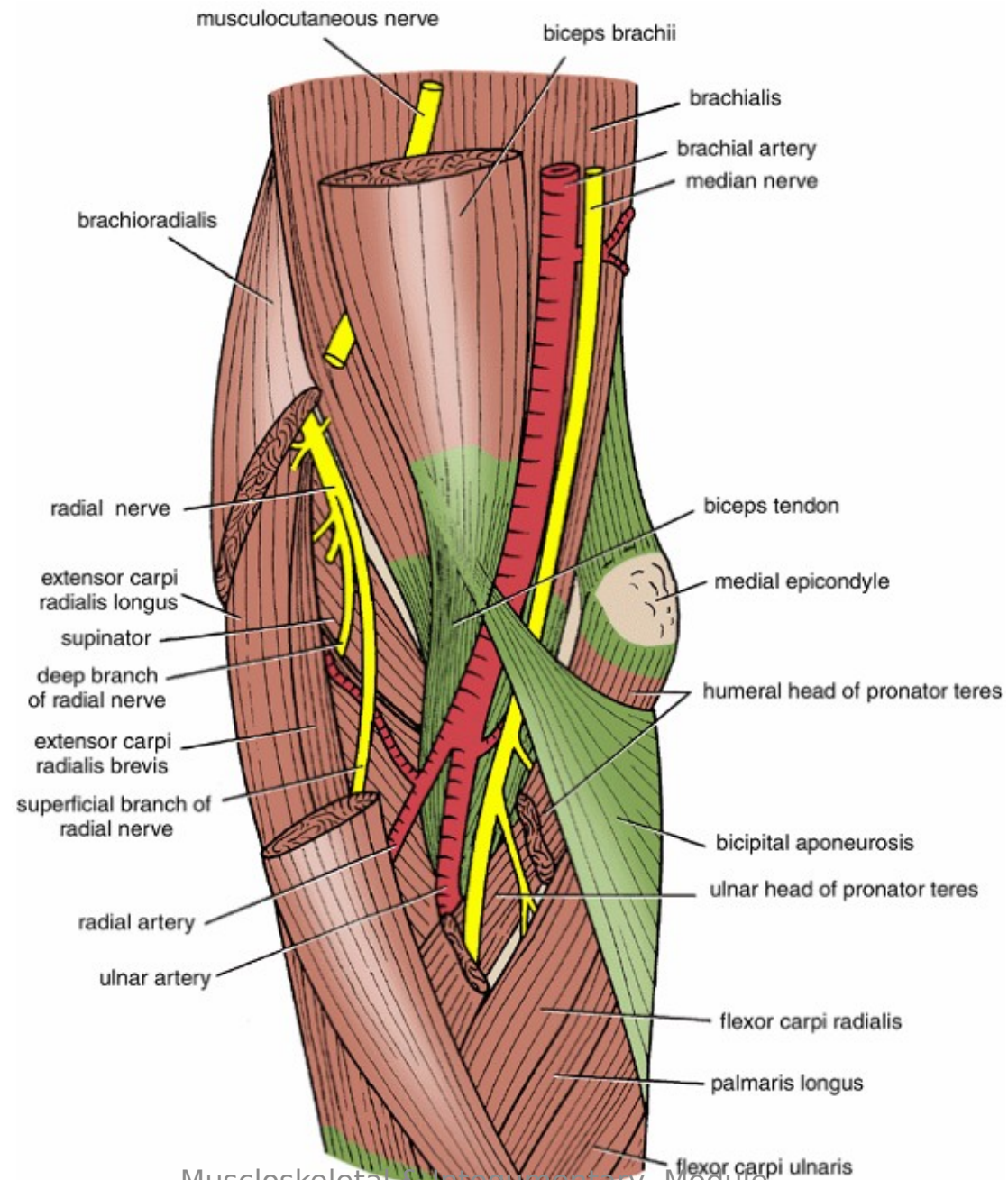
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The Cubital Fossa

A triangular depression that lies in front of the elbow.

Boundaries:

- **Laterally:** Brachioradialis muscle

Pronator teres muscle

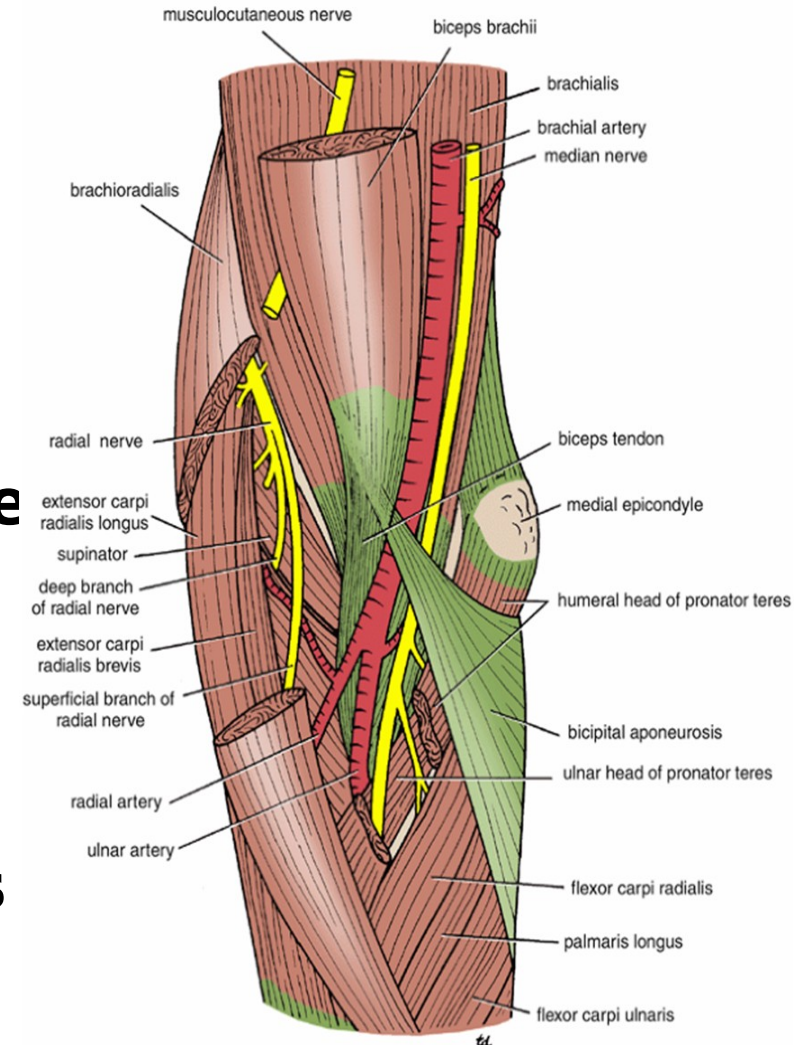
- **Medially:**

- **The base:** An imaginary line between the two epicondyles of the humerus.

- **The floor:** Supinator muscle laterally and the brachialis muscle medially

- **The roof:** Skin and fasciae and is reinforced by the bicipital aponeurosis

It contains median cubital



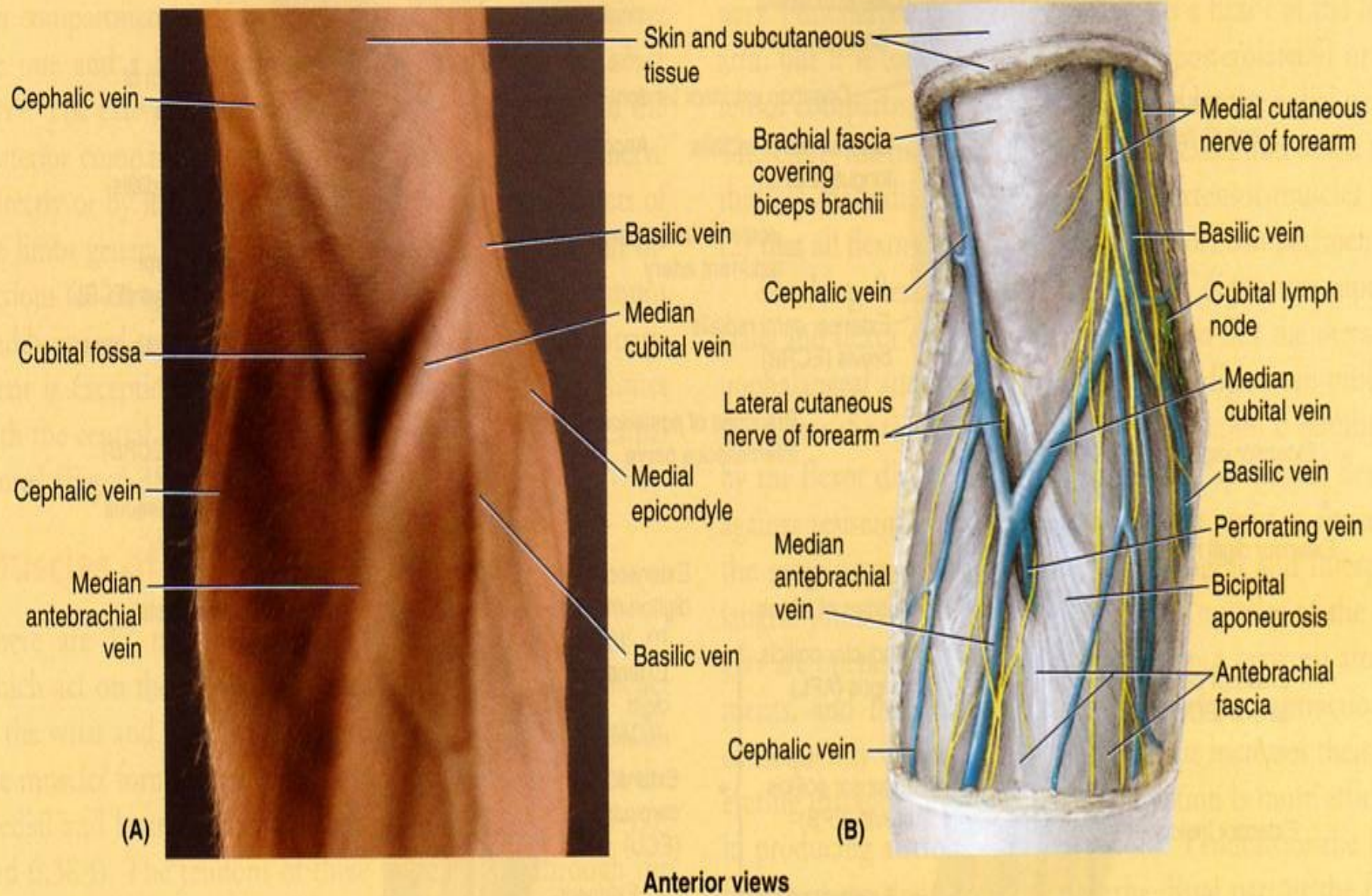


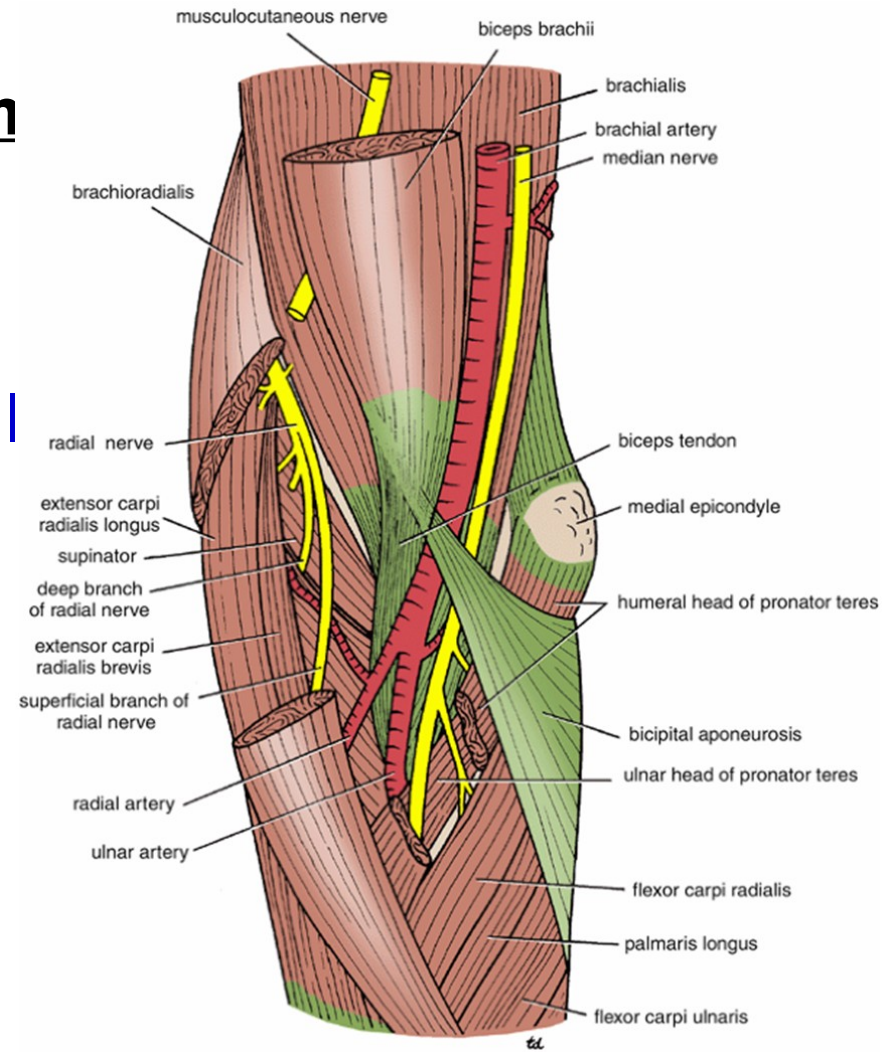
Figure SA6.11

Contents of the cubital fossa

The cubital fossa contains the following structures from the medial to the lateral side:

- Median nerve
- Bifurcation of the brachial artery into the ulnar and radial arteries
- Tendon of the biceps muscle
- Radial nerve and its deep branch

The supratrochlear lymph node lies in the superficial fascia over the upper part of





Which one of the following nerves enters the forearm between the two heads of pronator teres?

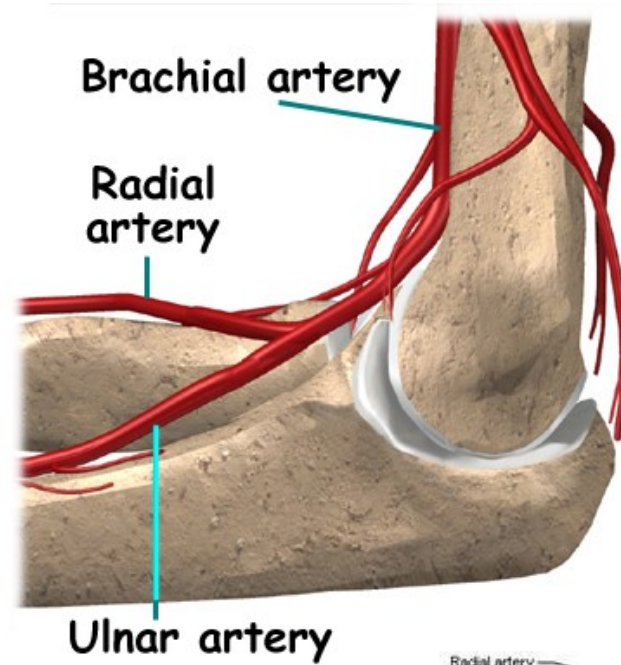
- a. Ulnar nerve**
- b. Radial nerve**
- c. Musculocutaneous nerve**
- d. Median nerve**
- e. Posterior interosseous nerve**



RADIAL ARTERY

BEGINNING OF RADIAL ARTERY:

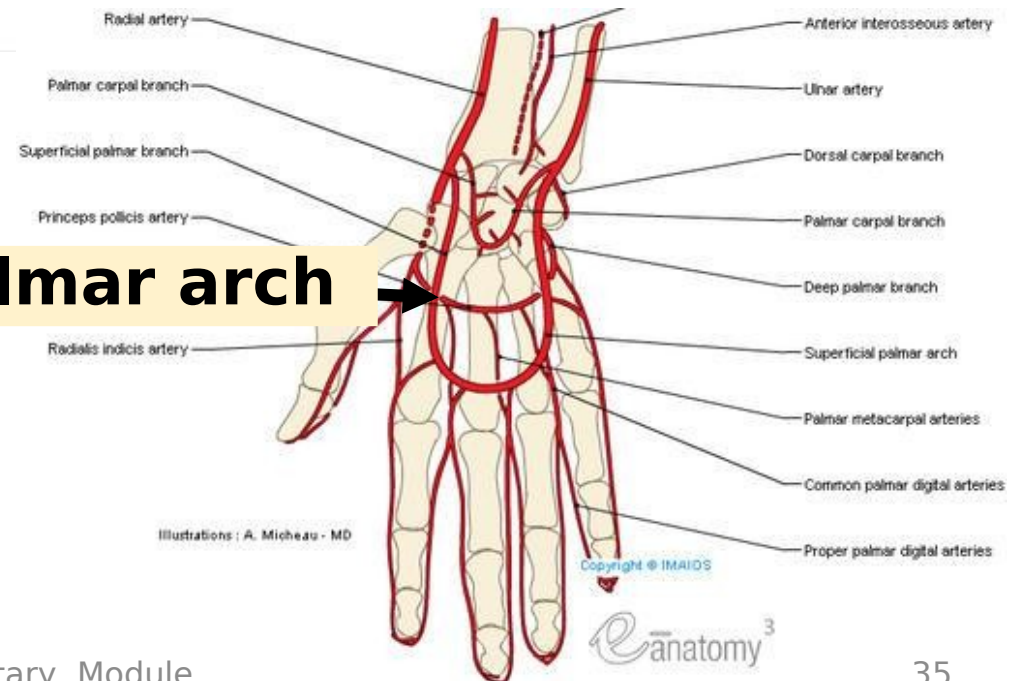
- One of 2 terminal branches of brachial artery
- At level of neck of the radius in cubital fossa



END OF RADIAL ARTERY:

- Continues as

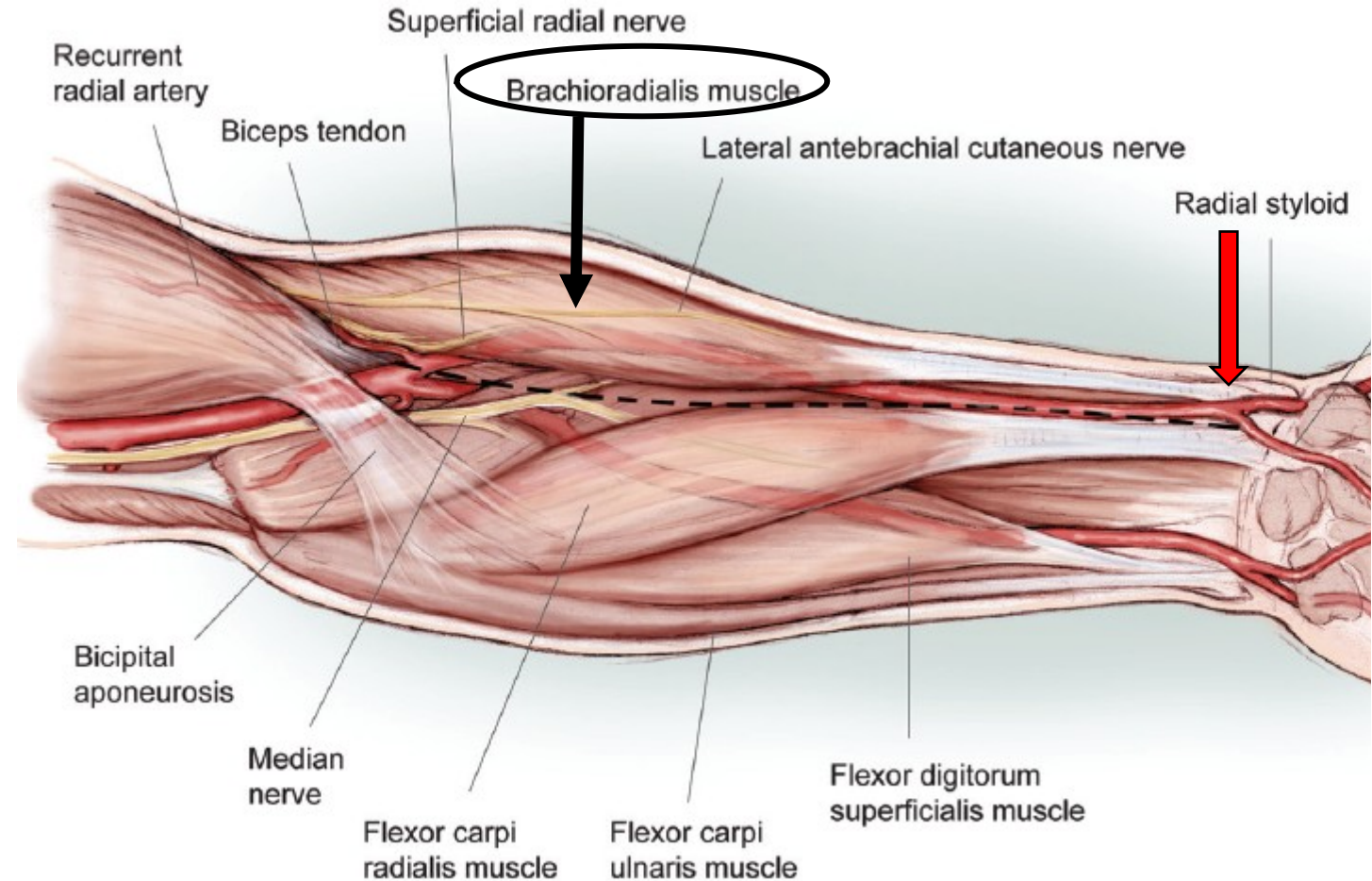
Deep palmar arch →



Upper 2/3 of forearm: Covered by brachioradialis

Lower 1/3 of forearm: Subcutaneous and its pulsations can be felt

It then passes backwards to run in the floor of anatomical snuff box.



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It ends by forming

**Where can you feel the
radial pulse?**

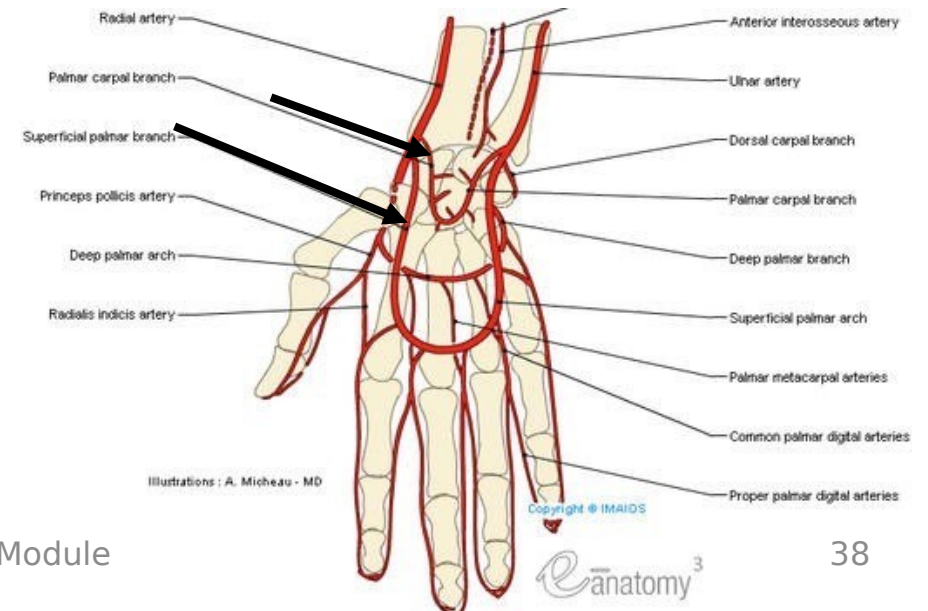
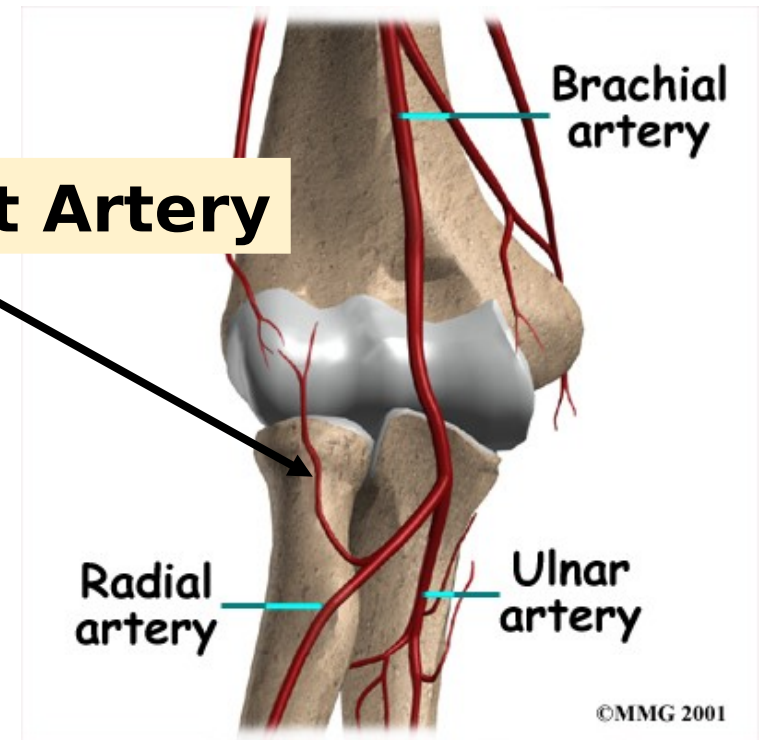
**LATERAL TO
THE
TENDON OF
FLEXOR
CARPI
RADIAL**



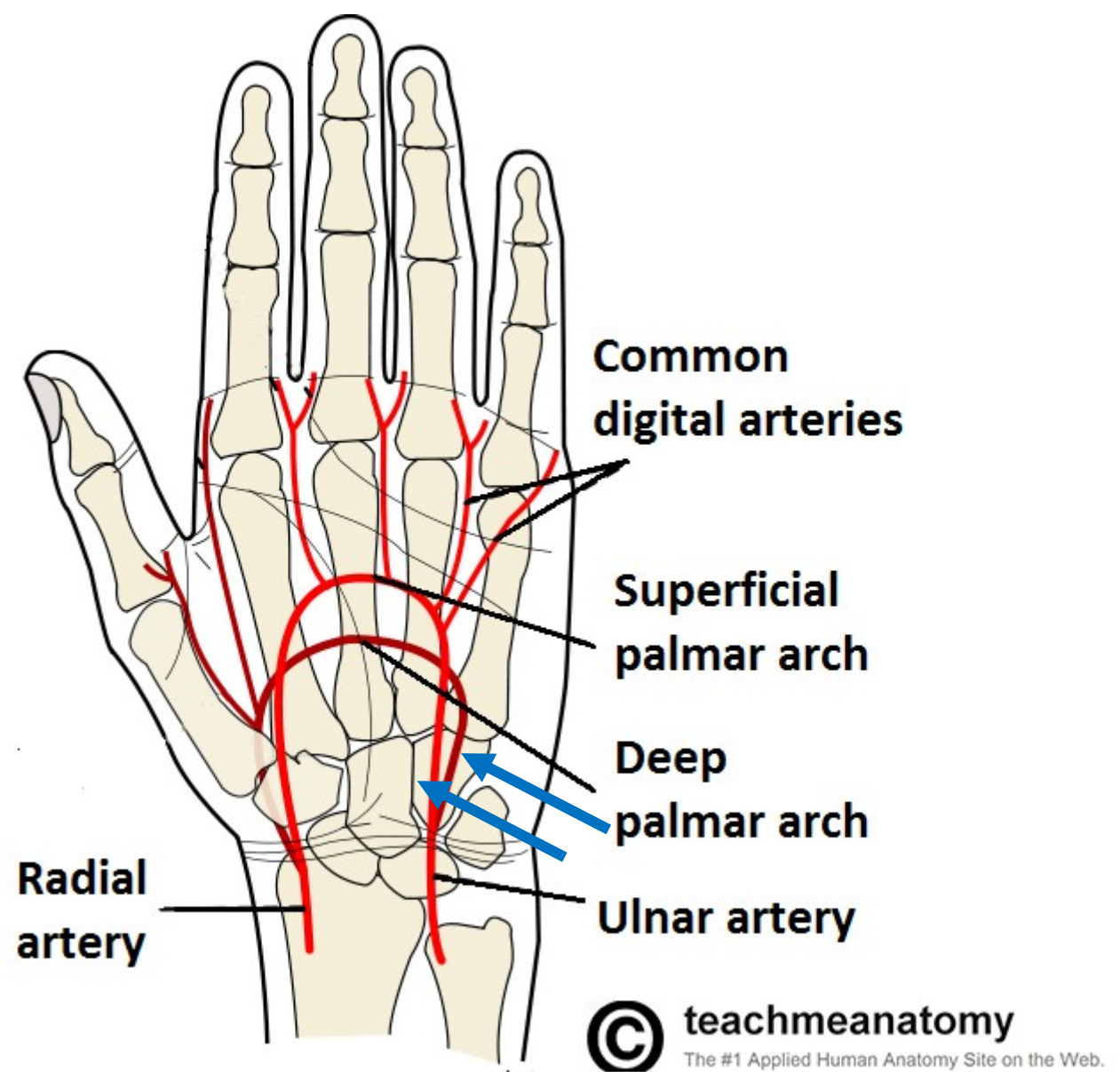
Branches of radial artery in the forearm :

1. Radial Recurrent Artery
2. Muscular branches
3. Anterior (palmar) carpal
4. Superficial palmar artery which joins the

Radial Recurrent Artery

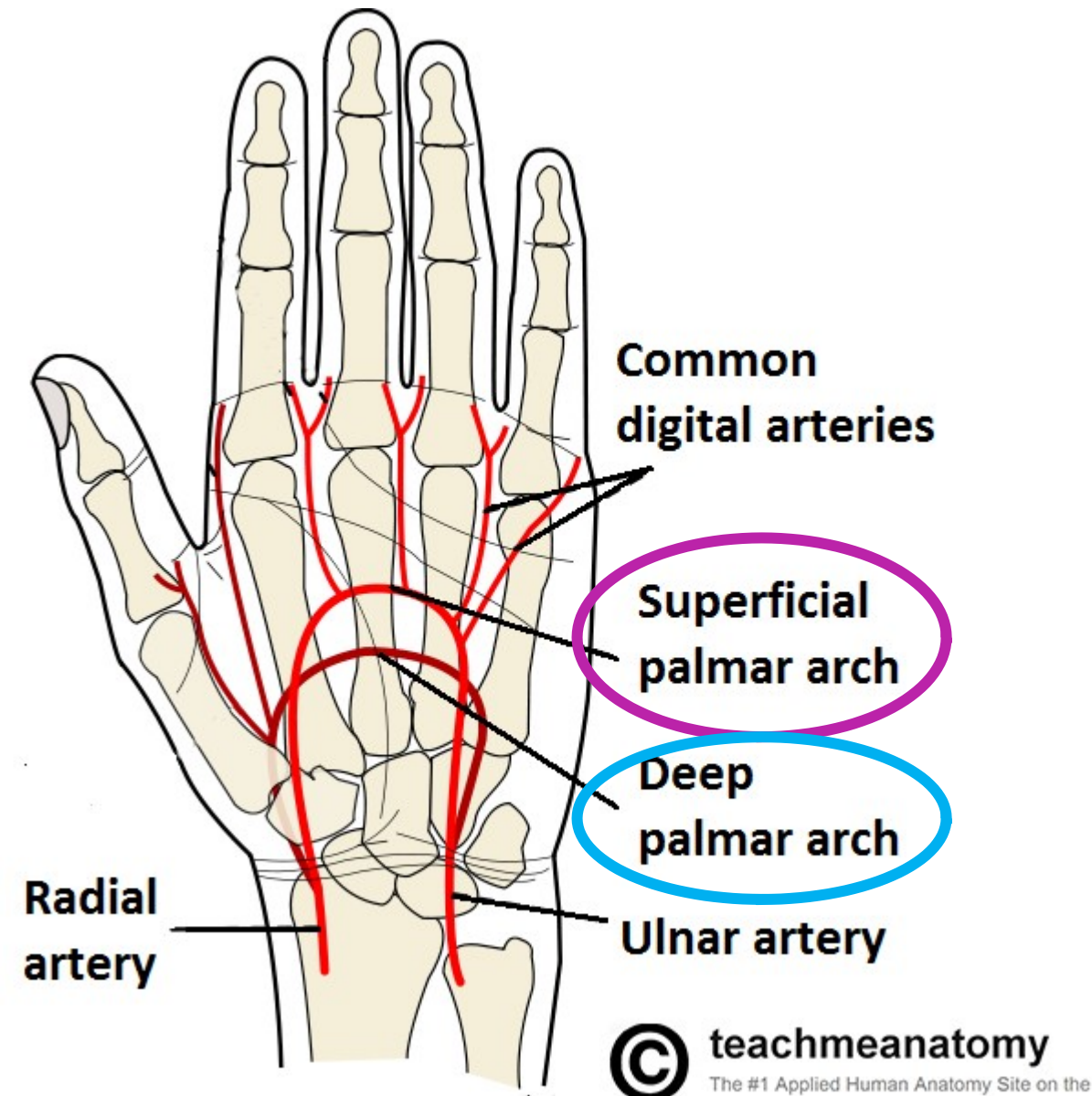


- **ULNAR ARTERY:**
- **BEGINNING OF ULNAR ARTERY:**
- **Larger terminal branch of brachial artery**
- **Opposite neck of radius**
- **END OF ULNAR ARTERY:**
- **Passes superficial to the flexor retinaculum & lateral to pisiform bone.**
- **Divides into 2 terminal branches; superficial and deep. The superficial branch is the continuation of the ulnar artery which forms the superficial**



Superficial branch
(continuation of
ulnar artery) forms
superficial palmar
arch with superficial
palmar branch of
radial artery

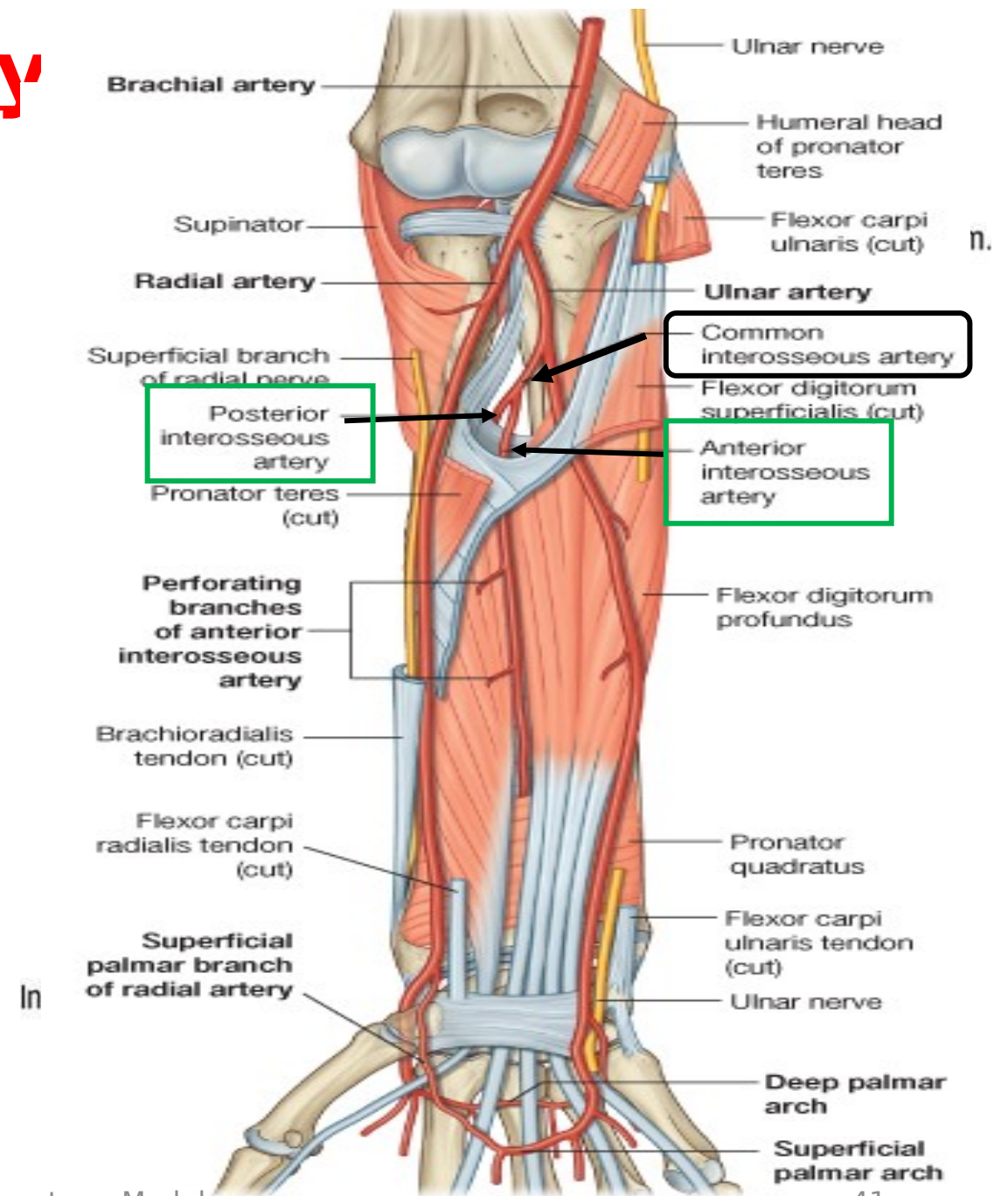
Deep branch: joins
end of radial artery
to form **deep palmar**
arch



Branches of ulnar artery in the forearm :

- 1) Anterior ulnar recurrent artery
- 2) Posterior ulnar recurrent artery
- 3) Common interosseous artery:
Gives:

- a. Anterior interosseous artery
- b. Posterior interosseous artery



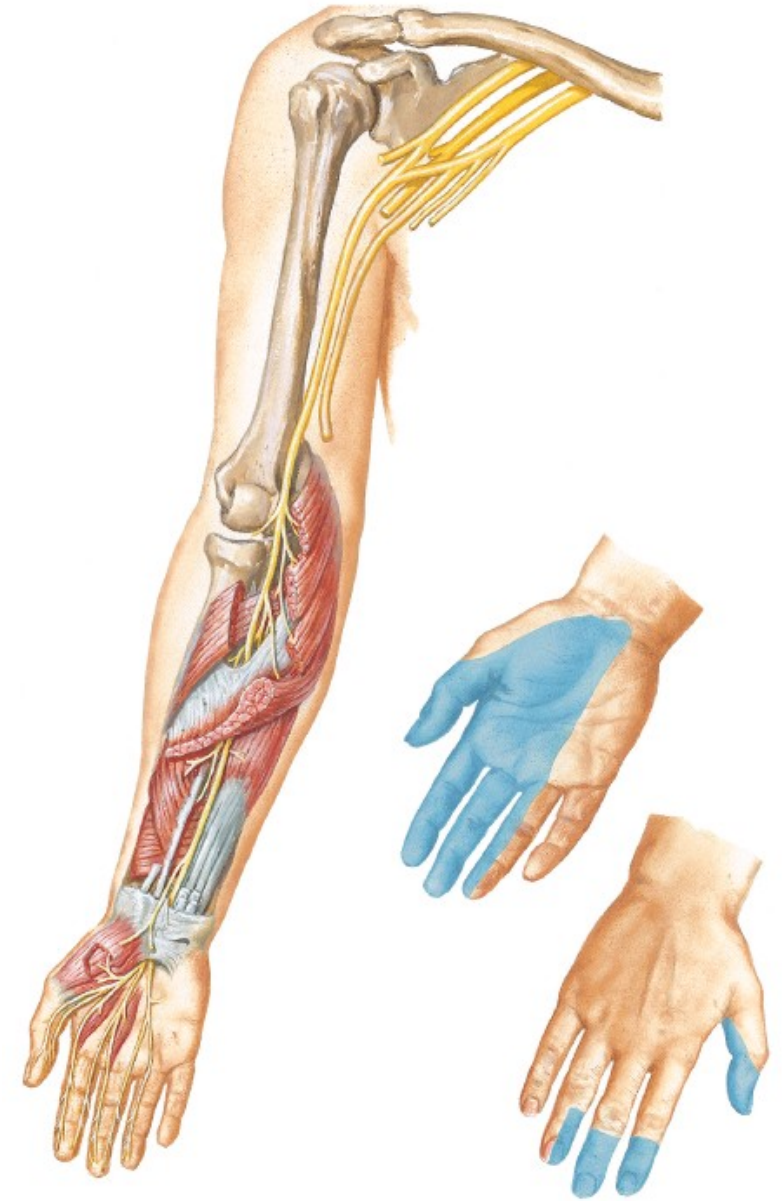
A medical student is asked to feel the radial pulse. He should put his fingers in which of the following sites?

- A. Medial to biceps tendon
- B. Lateral to biceps tendon
- C. Medial to flexor carpi radialis tendon
- D. Lateral to flexor carpi radialis tendon
- E. In roof of anatomical snuff box



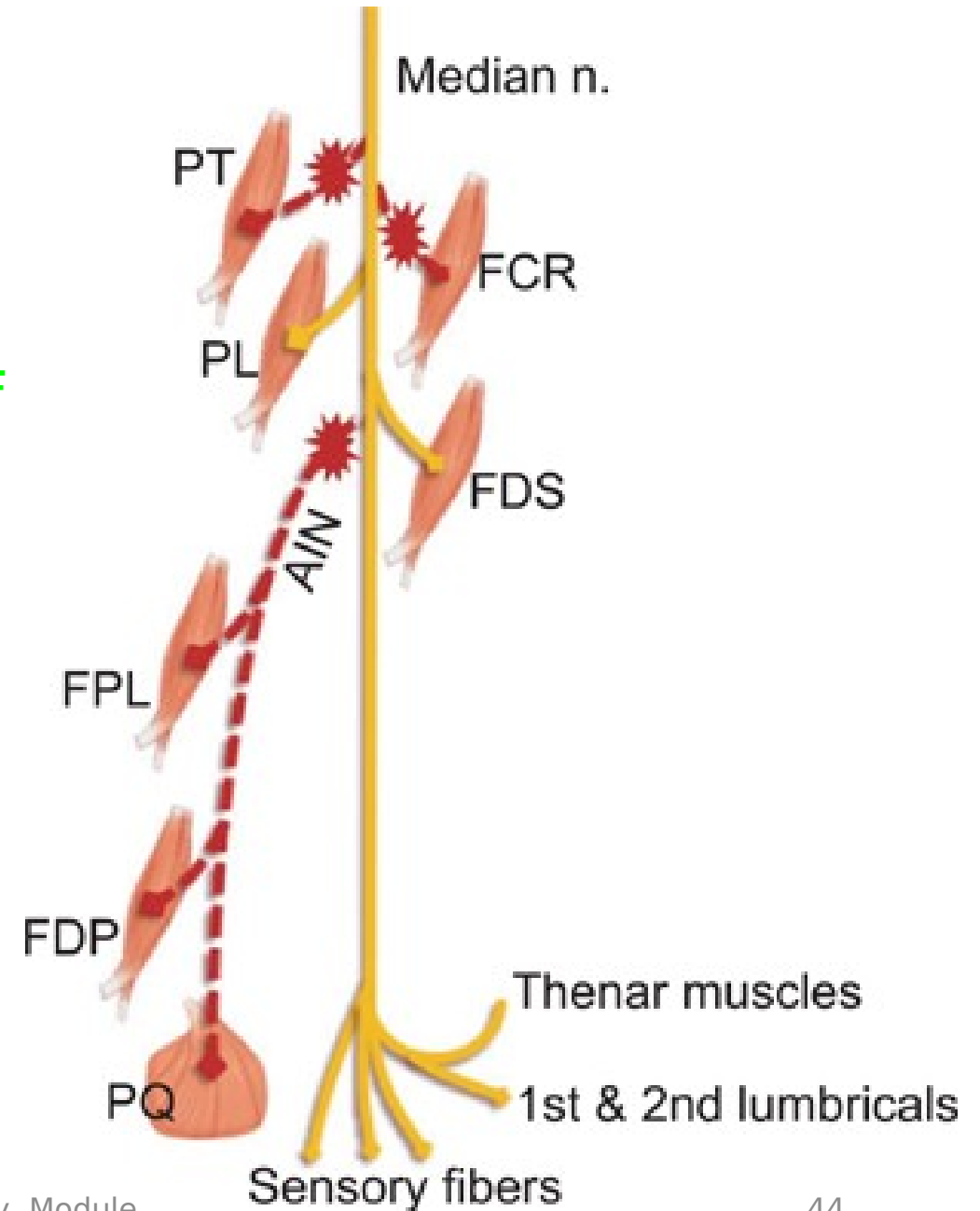
Median nerve

- It is the main nerve of the flexors of the forearm ,its root value is **C5,6,7,8,T1**.
- It arises by two roots: **lateral root** from lateral cord and **medial root** from medial cord.
- The nerve enters the forearm by passing between the two heads of pronator teres
- Then the nerve is **deep to flexor digitorum superficialis** .



Branches of Median nerve in the forearm:

- 1) Articular to the elbow & superior radioulnar joints
- 2) Muscular to all superficial flexors of forearm, **except** flexor carpi ulnaris (supplied by ulnar nerve)
- 3) Anterior interosseous to all deep flexors of forearm, **except** medial 1/2 of flexor digitorum profundus (supplied by ulnar nerve)
- 4) Palmar cutaneous branch passes superficial to flexor retinaculum to supply skin of lateral 2/3 of palm.

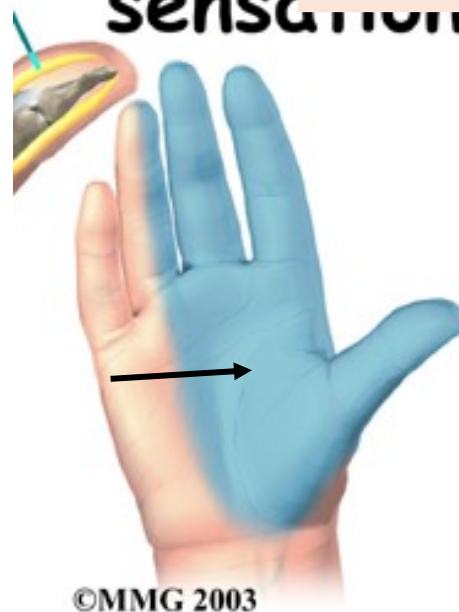


- The **anterior interosseous nerve** descend with the corresponding artery ,and it supplies the lateral $\frac{1}{2}$ of the flexor digitorum profundus ,flexor pollicis longus and pronator quadratus .

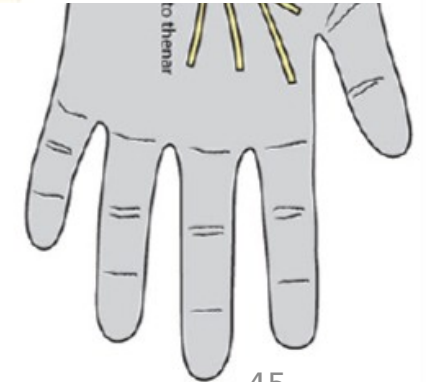
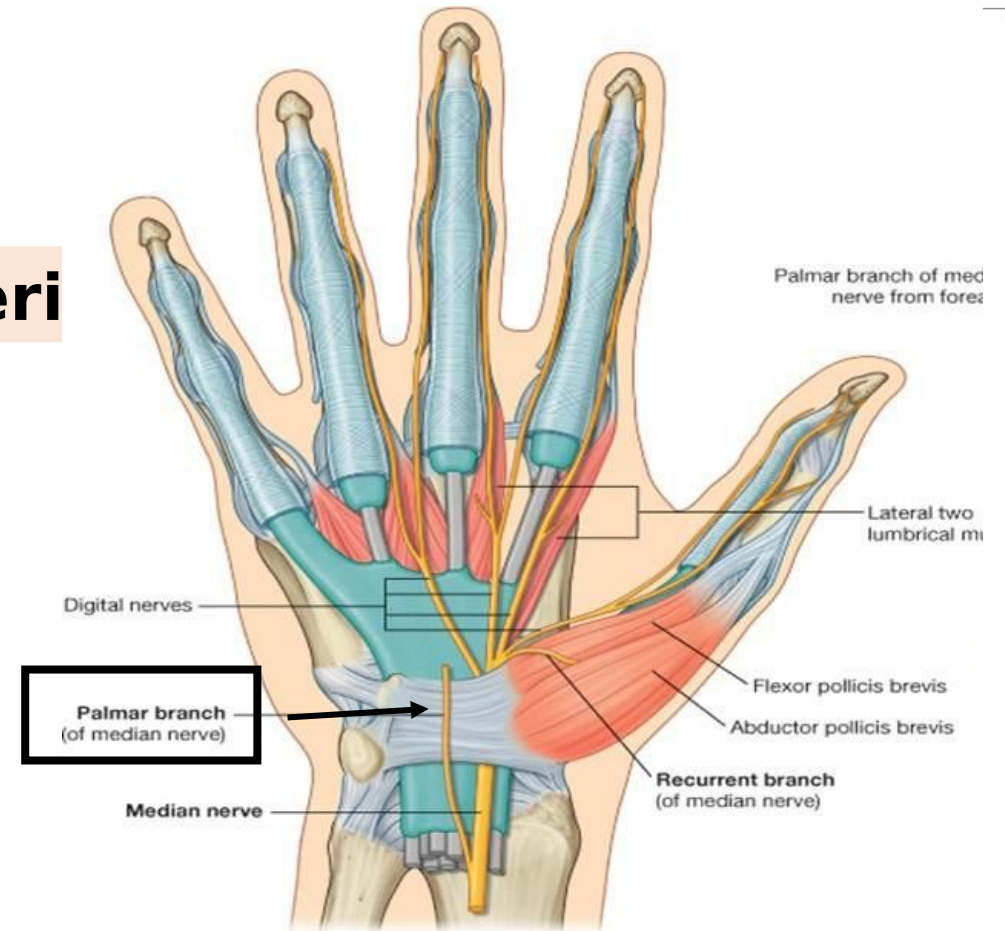
Median Nerve

Area of sensation

Anterior



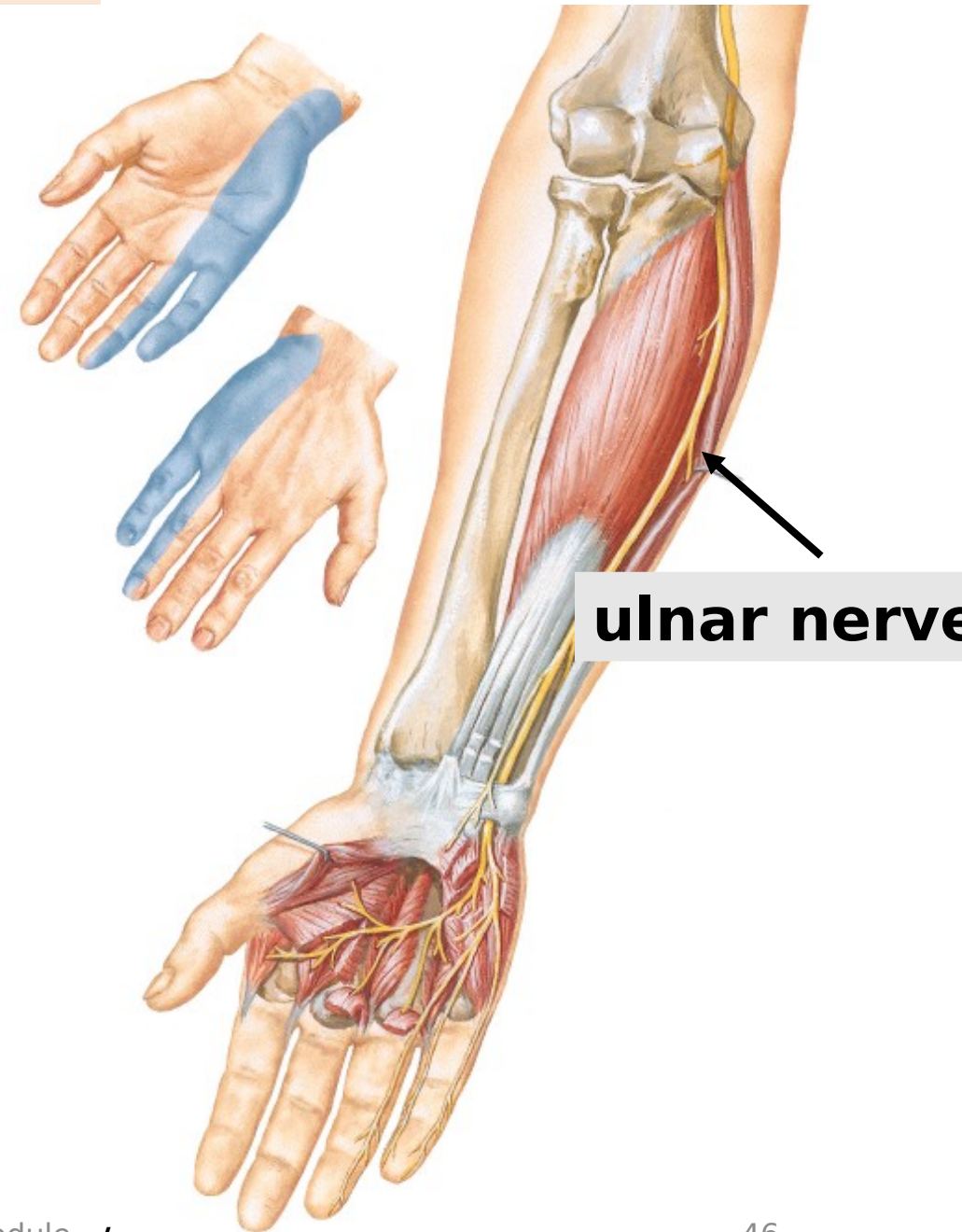
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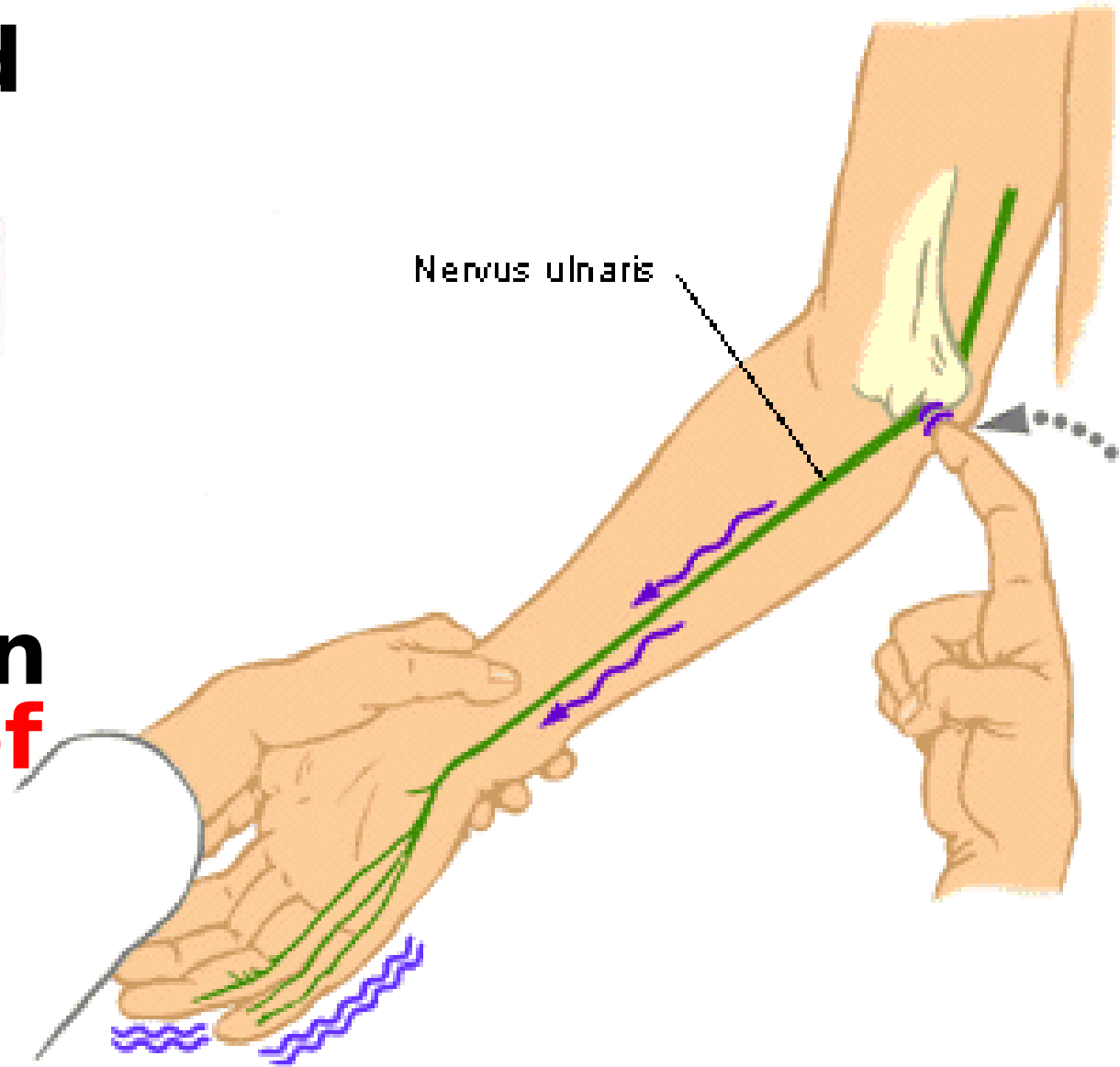
- **Palmar cutaneous**

The ulnar nerve

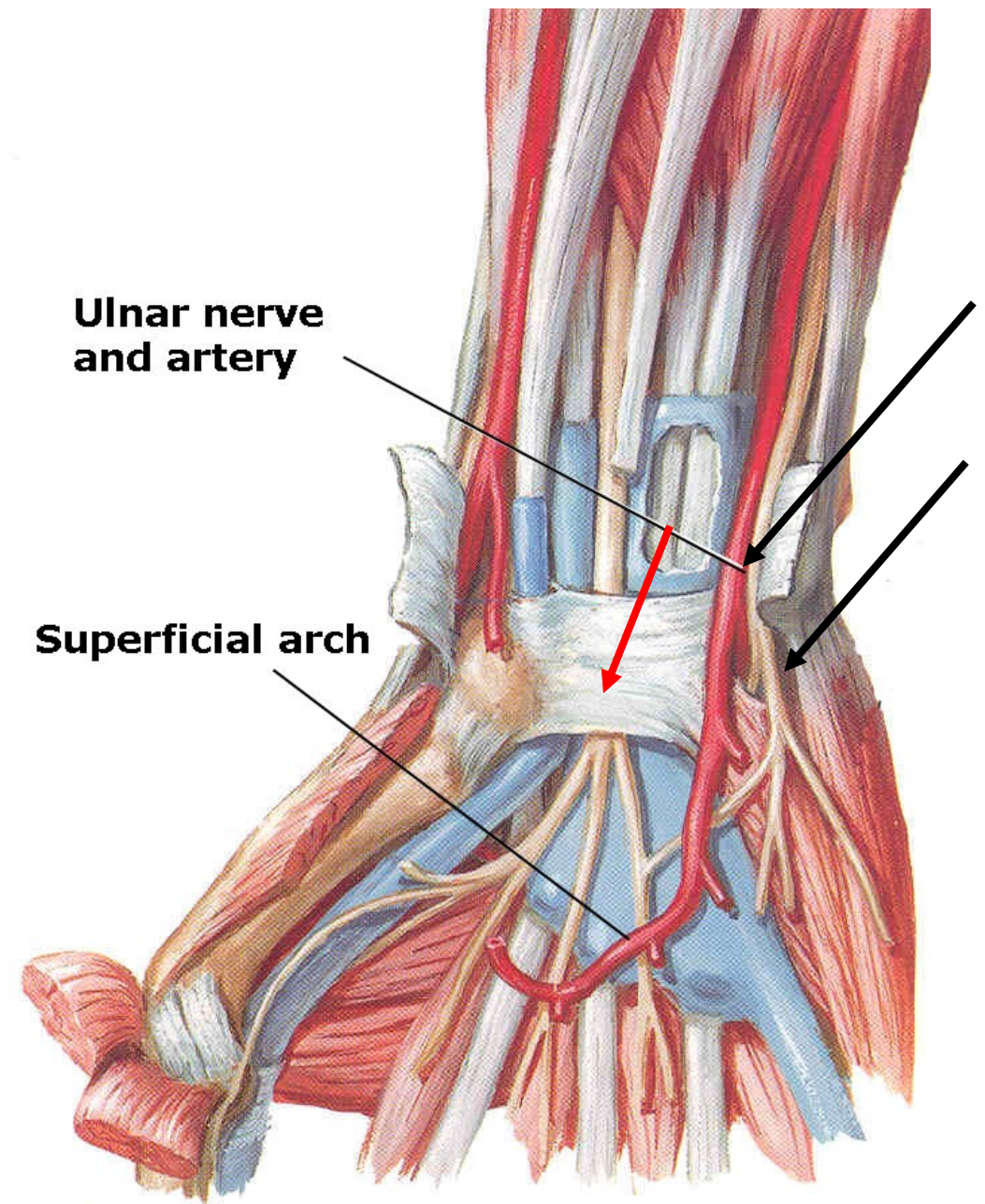
- It is the main nerve supplying most of the small muscles of the hand ,its root value is C7,8,T1.
- It arises from the medial cord of the brachial plexus .



- It passes behind the medial epicondyle of humerus.
- It enters the forearm by passing between the **two heads of the flexor carpi ulnaris**.



- Near the wrist ,the ulnar nerve become superficial and pass superficial to the flexor retinaculum .
- It ends in the hand by dividing into superficial and deep branches.



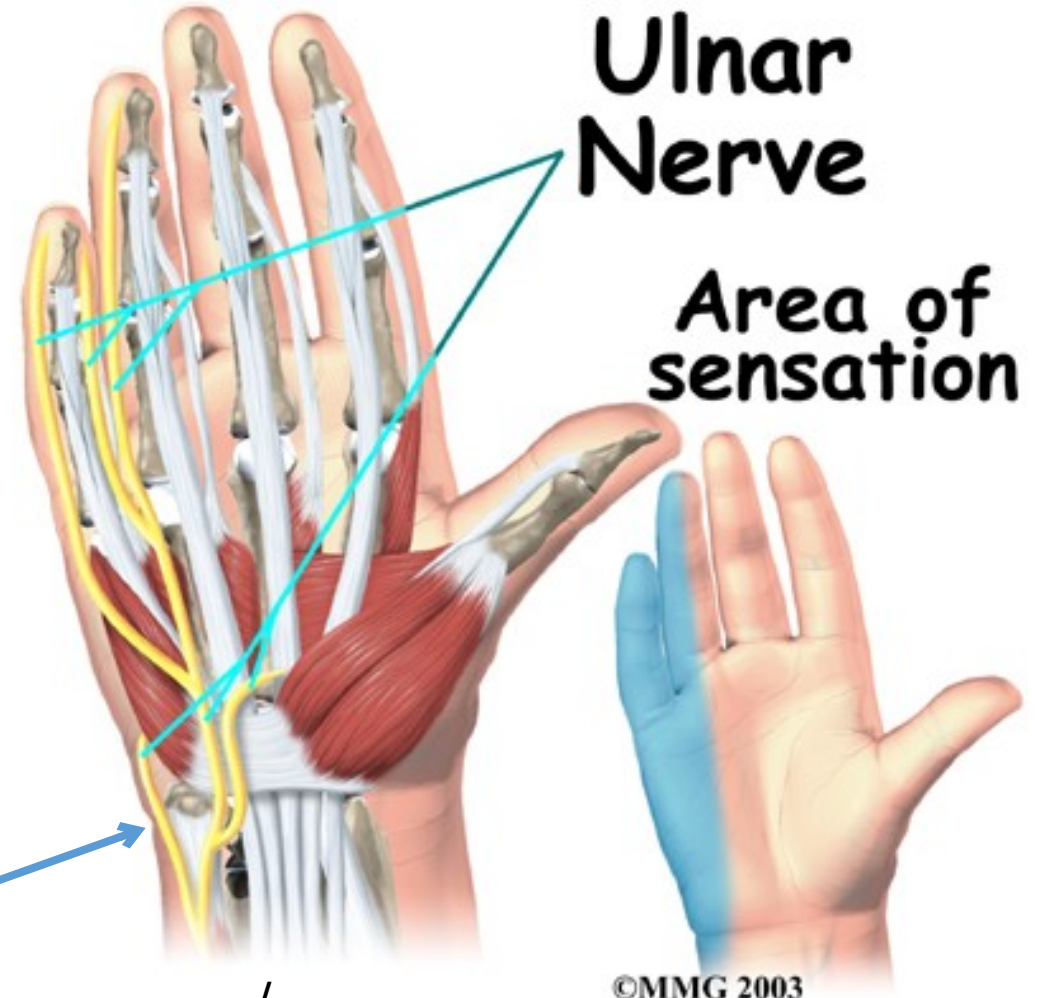
Branches of Ulnar nerve in the forearm:

Articular brs □ elbow joint

Muscular branches to flexor carpi ulnaris and medial $\frac{1}{2}$ of the flexor digitorum profundus.

Two cutaneous branches:
Palmar cutaneous br □
medial $\frac{1}{3}$ of the palm of the hand

Dorsal cutaneous br □
medial $\frac{1}{3}$ of the dorsum of the hand and dorsum of the medial one and half



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Radiology of the upper limb of a patient showed fractured medial epicondyle. Which of the following nerves is likely to be affected?

- A. Median
- B. Ulnar
- C. Radial
- D. Posterior interosseous
- E. Anterior interosseous



SUGGESTED TEXTBOOKS



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